# THE PLANT DISEASE REPORTER

Issued By

## THE PLANT DISEASE SURVEY

Division of Mycology and Disease Survey

BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

AGRICULTURAL RESEARCH ADMINISTRATION

UNITED STATES DEPARTMENT OF AGRICULTURE

Volume 33 Number 3

March 15, 1949

The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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DIVISION OF MYCOLOGY AND DISEASE SURVEY

Plant Industry Station — Beltsville, Maryland
Volume 33 — March 15, 1949 — Number 3

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## CYST-FORMING HETERODERA ENCOUNTERED IN SOIL SAMPLING

B. G. Chitwood

The Bureau of Entomology and Plant Quarantine has been making routine soil inspections of potato fields over a large part of the eastern and midwestern parts of the United States. This inspection is for the purpose of disclosing the presence or absence of the golden nematode of potatoes, Heterodera rostochiensis. All members of the genus Heterodera which are encountered are submitted to this Division for identification.

Recently samples from Walhalla, St. Thomas, and Cavalier, (Pembina County), North Dakota, were found to contain Heterodera punctata. This is the first time this species has been recorded in the United States. It was originally described by Gerald Thorne (1928) as the cause of poor growth of wheat in Saskatchewan. Correspondence with the plant pathologists in that area indicates that although it caused considerable trouble when first encountered, it later seemed to disappear. The same species has been recorded from Agrostis sp. in England. British workers are of the opinion that Agrostis is the normal host of this species. It seems quite possible that this is correct. Heterodera punctata may well be common in this country. If the normal host is Agrostis, this could easily explain some instances of poor wheat growth in newly-broken land. This species is similar to H. rostochiensis in gross body form since it is spheroid, and could easily be the basis of false reports of the presence of the latter organism.

Other species of the genus Heterodera sensu restricto known to occur in the United States include the sugar beet nematode, H. schachtii, and the polygonum nematode. Specimens agreeing with H. schachtii in all characters available have been found in soil samples from Houlton and Presque Isle, (Aroostook County), Maine. Only old cysts were present and a more thorough study of this situation seems warranted.

An apparently new species of lemon-shaped Heterodera was obtained in soil samples from Hopple and Grafton (Walsh County), Crystal and Cavalier (Pembina County), North Dakota. In this case we have no means of knowing what the host may be. Specimens are similar in most respects to the polygonum nematode but differ in that the egg shell is minutely speckled, and the stylet somewhat larger.

Heterodera rostochiensis, the golden nematode of potatoes, was intercepted from soil about the roots of Cyclamen sp. originating in Germany by inspectors J. N. Wood and C. C. Moody of the Division of Foreign Plant Quarantines, of the Bureau of Entomology and Plant Quarantine. This plant was brought over by a crew member of the AM SS Beauregard, presumably for friends or relatives. The plant and soil were destroyed by burning.

The Division of Nematology, Plant Industry Station, Beltsville, Maryland, is attempting to build up a collection of Heterodera in all stages of development from known hosts, and cooperation of plant pathologists is invited.

Species not as yet recorded from this country include H. avenae of oats, H. goettingiana of peas, H. humuli of hops, H. cruciferae of cabbage, H. cacti of cactus, and H. galeopsidis of Galeopsis tetrahit. It is possible that dock, clover and shadscale may harbor still other species. The morphology and host range of all of the species warrants thorough investigation.

DIVISION OF NEMATOLOGY

# A NEW ROOT DISEASE OF PIN OAKS POSSIBLY CAUSED BY THE NEMATODE, HOPLOLAIMUS CORONATUS COBB[1]

R. M. Viggars and A. C. Tarjan[5]

Plantings of pin oak, Quercus palustris Muench, have been observed severely affected by a new and extremely virulent trouble in Wilmington, Delaware. Symptoms of the condition were first apparent as early as 1943 and have increased in severity until roughly 50 to 60 percent of the pin oaks in Wilmington are exhibiting symptoms. Also affected, although not so severely as the pin oaks, are the red oaks, Quercus rubra L.

Symptoms of this trouble begin withhypersensitivity to drought and the appearance of chlorosis on the foliage of affected limbs. This is followed by a necrosis of the margins of affected leaves, very similar to physiological leaf scorch, which spreads inward, eventually involving the entire surfaces of the leaf blades. Once the leaves have died they may abscise prematurely, resulting in a tree with one or more live, but barren, limbs, or may persist on the affected limbs, standing out in marked contrast to the healthy foliage.

On the trunk, attention is drawn to the pronounced growth fissures which occur and the abnormally rapid formation of callous tissue over wounds. This callous formation occurs almost twice as rapidly as on normal trees. Water sprouts formed on the trunk in the advanced stages of this disease, as well as a fluted condition of the crown, suggest a condition in which the food manufactured in the leaves and translocated to the root system is not utilized by the roots and subsequently stimulates the cambium of the crown to excessive cell production.

Affected trees may be recognized in the autumnal coloration pattern by the tan to brown colored, dried appearance of the leaves in contrast to the foliage of healthy trees which is reddish-brown and lively in color. Symptoms may be expressed on individual limbs and spread slowly throughout the tree over a period of several years, or may appear generally throughout the tree in one growing season. Appearance of some trees killed by this malady is strikingly similar to injury caused by some types of illuminating gas.

Another striking symptom of this trouble is the widespread killing of root hairs and fibrous roots. When the rootlets of trees showing late or even early symptoms on the foliage are examined, they are found, for the most part, to be quite dead and easily pulled apart. After several fruit-

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1 Scientific Article No. A231 Contribution No. 2161 of the Maryland Agricultural Experiment Station (Division of Plant Pathology).

2 Research Fellow sponsored by the Bartlett Tree Expert Company, Stamford, Connecticut.

less inspections of roots from trees in various stages of decline, roots from a tree which had almost died from this trouble but which had been restored considerably by the addition of a large amount of organic material and fertilizer to the soil were examined. Two root pathogenic nematodes found in considerable numbers were Hoplolaimus coronatus Cobb, a migratory parasite whose feeding habits are yet relatively unknown, and meadow nematodes of the genus Pratylenchus, endoparasites which feed in cortical tissues of roots and are capable of causing serious failure of several crop and ornamental plants.

It appears that in the case of the recovered oak, soil treatment for the tree stimulated production of new roots which, in turn, were attacked by and supported the feeding of nematodes. Subsequent observations of the root systems of 20 affected seedlings yielded H. coronatus in 18 of the cases, the others failing to harbor the organism apparently due to a conspicuous absence of fine feeding roots. It is possible that either this nematode may be the cause of the trouble or that it may be closely related to its severity. This is not the first occurrence of this organism on pin oak, since R. L. Pierpont, then with the Bartlett Tree Expert Company divisional office in Wilmington, Delaware, submitted samples of pin oak roots to the Division of Nematology, Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Maryland in October 1947. Dr. G. Steiner, Principal Nematologist in Charge of the Division, established the occurrence of this nematode on the roots at that time.

It is not concluded that the frequent occurrence of nematodes in oaks showing the symptoms is proof that this oak condition is directly or even indirectly due to nematodes. However, continual efforts to explain the oak trouble by relating it to known parasites, physiological disturbances, toxicants, or food deficiencies have been without success.

Another fact, worthy of consideration, is the finding of meadow nematodes in pin oak, a new host for this pathogen. Although only one plant which bore these eelworms in considerable numbers was found by the authors, this discovery was substantiated by the finding of meadow nematodes also in oak roots by Mrs. C. Lewis of the Division of Nematology at Beltsville less than a week later. On the basis of these findings, the possibility that this pathogen may also be an important factor in the decline of oaks should also be considered.

Although the trouble described above has been definitely found in Wilmington, Delaware, on pin oaks and red oaks, symptoms have been noticed in Washington, D. C., Maryland, Pennsylvania, and New Jersey.

BARTLETT TREE EXPERT COMPANY, WILMINGTON, DELAWARE AND DIVISION OF NEMATOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, BELTSVILLE, MARYLAND, AND DIVISION OF PLANT PATHOLOGY, UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND, COOPERATING

# A METHOD OF ISOLATING PHYTOPHTHORA CINNAMOMI DIRECTLY FROM SOIL

W. A. Campbell

Phytophthora cinnamomi Rands recently has been reported associated with the roots of littleleaf-diseased shortleaf pine.[1] The fungus has been isolated only from recently dead or dying roots mostly one-sixteenth inch in diameter or smaller. Successful recoveries of the fungus have averaged less than 2 percent for all root pieces from trees from which the fungus was isolated. The difficulty of obtaining satisfactory samples of the fine roots from many of the heavy soils on which littleleaf occurs, the labor involved in making large-scale isolations from root material, and the low percentage of successful isolations necessitated the development of a simpler method for testing for the presence of P. cinnamomi in the root area of healthy and diseased trees.

Preliminary experiments whereby apple fruit tissue was placed in contact with soil suspected of containing Phytophthora demonstrated that, under suitable conditions of temperature and moisture, the fungus would readily grow from the soil into the apple. From the infected apple tissue the fungus was readily obtained in pure culture on cornmeal agar plates. The method as finally developed is essentially an adaptation of Tucker's[2] apple technique for the differential isolation of certain species of Phytophthora from infected plant tissue. However, instead of plant tissue, soil suspected of containing P. cinnamomi is introduced into the apples. Since the literature on P. cinnamomi fails to mention an easy method for isolating the fungus directly from the soil, the method used in studying the distribution of the fungus under littleleaf and healthy trees is given in detail.

Soil samples were taken to the desired depth and number around a given tree in conformation with a sampling pattern. These were placed in paper bags with appropriate designations so that reference could be made later to the distribution of the fungus in the root area. A portion of each sample was then tightly packed into a one-half inch hole bored with a cork borer diagonally downward but not quite through an apple. The hole was filled with soil to within one-half or three-quarters of an inch of the top and the remaining space was filled with distilled water. After the soil was thoroughly saturated with water the opening was sealed with

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1 Campbell, W. A. Phytophthora cinnamomi associated with the roots of littleleaf-diseased shortleaf pine. U. S. Bur. Plant Indus., Soils, and Agr. Engin., Plant Dis. Reptr. 32: 472. 1948.

2 Tucker, C. M. Taxonomy of the genus Phytophthora de Bary. Missouri Agr. Expt. Sta. Res. Bul. 153. 208 pp. Illus. 1931.

scotch tape. In order to provide insurance against losing the results from a soil sample through the premature breakdown of the apple, or through interference of contaminating organisms, each sample was tested in duplicate, with two apples. Sample designations were made directly on the apple with a wax pencil. After the apples were inoculated with the soil they were held at room temperatures ranging from 60° to 80° F.

P. cinnamomi, if present, caused a firm dry rot of the apple tissue in from five to ten days. The presence of the fungus was verified by examining the mycelium which developed on cornmeal agar around bits of the rotted apple. Rot caused by P. cinnamomi is firm and causes no appreciable softening of the apple tissue. Rots from which species of Trichoderma, Gliocladium, Penicillium, Rhizopus, and Alternaria have been isolated are much softer and wetter. Furthermore, rots caused by these organisms were usually slower to develop and usually became troublesome only after 8 to 10 days. By this method recoveries of P. cinnamomi were made from as high as 75 percent of the soil samples taken from the root areas of littleleaf trees.

Of the apple varieties tested, Golden Delicious gave the most satisfactory results, mainly because it tended to dry out rather than break down at the temperatures used to encourage growth of the fungus. The yellow or greenish-yellow color of this variety was also advantageous because the brown rot caused by P. cinnamomi was conspicuous by contrast. Also, the light color of Golden Delicious and other green or yellow apples made pencil markings easier to read. Starks Delicious, Staymans, Rome Beauty, York and several other unidentified varieties have also given good results provided they had not been held too long in storage, were not badly bruised or were not already contaminated with Penicillium and other organisms.

DIVISION OF FOREST PATHOLOGY, BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, U. S. DEPARTMENT OF AGRICULTURE, IN COOPERATION WITH SCHOOL OF FORESTRY, UNIVERSITY OF GEORGIA, ATHENS, GEORGIA

## CARNATION BUD ROT IN PENNSYLVANIA

W. D. McClellan

On December 2, 1948, a carnation greenhouse was visited at Kennett Square, Pennsylvania, in company with Mr. C. A. Thomas, an entomologist from the Pennsylvania Agricultural Experiment Station. Bud rot was present in two varieties of carnations, Joan Marie and Northland. Many buds of Joan Marie were rotted and considerable loss in this variety was being experienced by the grower. Only one infected bud was found in the variety Northland. Other varieties in the same houses did not show any rot. Symptoms were typical of bud rot and the mites (Pediculopsis graminum Reuter) described as always associated with the disease by Heald[2] and by Stewart[3] were present. Fusarium poae (Pk.) Wr. (=F. tricinctum f. poae (Pk.) Snyder and Hansen) was readily isolated from the rotting buds. Both Heald and Stewart state that the disease is likely to be present in poorly managed houses where the humidity is high, but at the time of our visit the Kennett Square greenhouses appeared to have been well managed. The humidity in the houses had been high, however, because of the numerous fall rains. Because this disease is found infrequently this report is thought to be worthwhile even though it has been recorded by Weiss[4] as occurring from Massachusetts to Virginia and in Kansas, Nebraska, and Washington. Prior to Cooper's report[1] the last published report of this disease in the United States was in 1915.[5]

DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, PLANT INDUSTRY STATION, BELTSVILLE, MARYLAND

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1 Cooper, Kenneth W. Relations of Pediculopsis graminum and Fusarium poae to central bud rot of carnations. Phytopath. 30: 853-859. 1940.

2 Heald, F. D. The bud rot of carnations. Nebr. Agr. Expt. Sta. Bull. 103: 1-24. 1908.

3 Stewart, F. C. The Sporotrichum bud rot of carnations and the silver top of June Grass. N. Y. (Geneva) Agr. Expt. Sta. Tech. Bull. 7: 93-119. 1908.

4 Weiss, Freeman. Dianthus. In Check List Revision, U. S. Dept. Agr. Plant Disease Reporter 32: 76-79. 1948.

5 Weiss, H. B. The occurrence of Pediculopsis graminum Reuter and the carnation bud rot in New Jersey. (Acar.) Ent. News 26: 183. 1915.

# BOTRYTIS ON GREENHOUSE ROSES

W. D. McClellan

Blighted young rose shoots of the variety Golden Rapture and rotting unopened rose buds of the variety Brandywine were brought to us by a rose grower from Kennett Square, Pennsylvania, on November 15, 1948. The tips of the very young tender shoots were dying back with a brown rot. This rot did not always occur at the tips of the shoots, but frequently originated an inch or two below the tip. The rot in the buds apparently began at the base of the bud and progressed upward into the bud itself and downward into the pedicel. A brownish exudate appeared on some of the buds. Hyphae and spores of Botrytis were present on some of the buds. A Botrytis with a range in spore size of 6.4-9.6 x 9.6-16.0 microns was isolated from both the shoots and the buds. This fungus was tentatively identified as Botrytis cinerea Pers.

Freshly cut buds of the variety Brandywine and tender young shoots of the variety Golden Rapture were sent to us later by the Kennett Square grower. Half of the buds and half of the shoots were inoculated by dusting them with freshly produced spores from infected tissue. The other half was inoculated by injuring the buds and shoots with a sterile needle and placing bits of the rose Botrytis growing on agar over the wound. The inoculated buds and shoots were divided into 3 lots, placed in moist chambers and incubated at 65°, 75°, and 85° F. for seven days. Infection took place at each of the temperatures and in the unwounded as well as the wounded tissue. Rotting of the buds and shoots was more severe at 65° and 75° than at 85°, and the rot had progressed further in the unwounded than in the wounded tissue. Botrytis was sporulating abundantly over the rotted areas. The rot extended as much as three and one-half inches below the buds and completely destroyed them. The shoots were rotted back three to four inches and many of the youngest leaves were also rotted. Infection of the unwounded buds in all instances began at the bases of the buds whereas infection of the uninjured young shoots began at the tips, through leaf pedicels, through broken thorns, or through apparently uninjured areas at any place along the succulent stem.

Weiss (3) lists Botrytis cinerea Pers. as the cause of a cosmopolitan bud and twig blight of roses. Waterman (2) and others (1, 4, 5) have described the effects of Botrytis on rose buds and young shoots. However, reports of Botrytis on roses have been concerned largely with a die-back or bud-blight of field-grown roses and there are few reports of the disease on roses grown under glass. It would appear that the disease should have been more severe in greenhouses in years past when syringing was practiced regularly and the humidity remained high for long periods of time. On the contrary, there were few complaints about Botrytis on greenhouse-grown roses. Now that insects in greenhouses are controlled

effectively by aerosol treatments with HETP, TEPP, or Parathion, and blackspot, due to Diplocarpon rosae Wolf, is no longer a problem, growers have become much more conscious of other problems such as powdery mildew, Botrytis, bullheads, etc. A few buds blasted with Botrytis now assume much more importance in their thinking.

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1. Deacon, G. E. Some effects of Botrytis cinerea on roses. Brit. Mycol. Soc. Trans. 17: 331-333. 1933.
2. Waterman, Alma M. U. S. Dept. Agr. Farmers' Bull. 1547: 1-19. 1928.
3. Weiss, Freeman. Rosa. In Check List Revision. U. S. Dept. Agr. Plant Disease Reporter 26: 205-210. 1942.
4. Wenzl, H. Botrytis cinerea als Erreger einer Fleckenkrankheit der Knospen und Blüten der Rose ("Blutenfeuer"). Gartenbauwiss. 11: 462-472. 1938.
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DIVISION OF FRUIT AND VEGETABLE CROPS AND DISEASES, PLANT INDUSTRY STATION, BELTSVILLE, MARYLAND

## SOME NOTES ON VEGETABLE DISEASES IN OREGON

B. F. Dana

Verticillium wilt [V. alboatrum] occurs generally every year in the Dalles area on market tomatoes causing shoot blight and vascular injury. Death of the shoots opens up the plant and leads to sunburn of the fruits. Estimated loss amounted to 15 to 20 percent in some fields with probable average of 50 percent.

Beet rust (Uromyces betae) was general in a small planting in western Linn County, October 15. It appeared late and caused no loss.

Yellow mosaic of bean (Bean virus 2) annually occurs generally but in localized areas in Umatilla County and in the Willamette Valley, on the Blue Lake Variety principally but also affects to a lesser degree other varieties grown near clover fields or gladiolus plantings. The overall loss is low but parts of localized fields may be a total loss.

On beans Sclerotinia (Sclerotinia sclerotiorum) occurs annually. In the 1948 season it was widely distributed over areas subject to overflow of Willamette main river in fields where Blue Lake type of beans have been grown continuously for many years. There were losses to 50 percent in some fields.

OREGON AGRICULTURAL EXPERIMENT STATION, CORVALLIS

# SUSCEPTIBILITY OF SELECTIONS OF PERFECTION PEAS TO STRAINS OF YELLOW BEAN MOSAIC

Frank P. McWhorter[1]

The symptomatology of Yellow Bean Mosaic and the properties of the causal virus, Bean virus 2, were first described by Pierce (2) in 1934. His observations are based on an isolation from a plant of the Red Valentine variety of Phaseolus vulgaris L. grown in a field at Madison, Wisconsin, in 1931. He shows in a table (Page 110) for differentiating his bean viruses, that he was unable to infect Perfection peas with Bean virus 2. During the past four years we have confirmed this observation with several strains of Bean virus 2 from Oregon and Washington sources.

A survey of the virus diseases affecting peas grown for canning and freezing in the vicinity of Milton, Oregon, and Walla Walla, Washington, has been made during the past two years. Along with other viruses, Yellow Bean Mosaic was very prevalent in these peas during 1947. It occurred in several fields planted with peas belonging to the Perfection-group[2]. The difficulties involved in interpreting the complex of viruses and insufficient time prevented us from obtaining a satisfactory record of the Perfection pea selections that became infected with Bean virus 2 that season. Therefore, samples of the selections of Perfection peas grown in the region were obtained through the courtesy of the geneticists and field men of the canneries concerned. Plants from these samples (Table 2) were inoculated with two strains of Bean virus 2 considered typical for the region to obtain a direct reading on the susceptibility of the selections to this virus when unaccompanied by other viruses.

Bean virus 2 can be easily inoculated to susceptible varieties of peas when the plants are about four inches high and are growing vigorously at a temperature around 65° F. Several Oregon strains of the virus when transferred from infected Vicia faba L. stock plants with 600-mesh carborundum have consistently infected 70 percent or more of the pea-inoculates.

Table 1 records the inoculation of five different strains of Bean virus 2 to 216 Perfection[3] pea plants. This table is a composite of several inoculation series carried out during 1946, 1947, and 1948. There was no evidence of infection. Return inoculations were made to Vicia faba plants in several of the series to determine whether the virus was latent in the

1 Published as technical paper No. 567 with the approval of the Director, Oregon Agricultural Experiment Station. Contribution of the Department of Botany and Plant Pathology.

2 The peas belonging to the Perfection group are in part the horticultural variety Perfection, in part selections or strains of that variety, and in part hybrids of Perfection peas with other horticultural varieties.

3 These Perfection pea seeds were obtained from the G. M. Whitney Co.

Table 1. Inoculation of Bean virus 2 to Perfection peas.

Summary of Trials 1946 to 1948 Inclusive

| Designation and brief description of Oregon Agricultural Experiment Station strains of Bean virus 2 used to inoculate Perfection peas | No. of times tested | Total positive over total inoculated |
|---|---|---|
| Strain B. Lethal to Blue Lake beans Mild mottle in Vicia faba. Weak but specific cytological virus-evidence. T.i.p. 56° C. | 3 | 0/40 |
| Strain 203. From mottled Blue Lake beans. Blue green mottle in Vicia faba. Agrees closely with the virus as described by Pierce. Cytological virus-evidence typical. T.i.p. 57° C. | 5 | 0/68 |
| Strain 250. From Gladiolus. Injures and yellows Vicia faba more than other strains in this series. Abundant cytological virus-evidence. T.i.p. 60° C. | 2 | 0/20 |
| Strain 306. From Alfalfa. Bright yellow mottle in Vicia faba. Abundant cytological virus-evidence. T.i.p. 60° C. | 4 | 0/44 |
| Strain 401. From peas. Bright yellow mottle in Vicia faba. Cytologically very similar to strain 306. T.i.p. 58° C. | 4 | 0/44 |

Explanation: No. of times tested -- Number of series or experiments made. Thus strain 203 was tested five different times on a total of 68 plants.
T.i.p. -- Thermal inactivation point.

inoculates, but in no case was the virus recovered. In addition to the five strains of virus listed in Table 1, four other Oregon strains of the virus were inoculated to lots of ten or more Perfection peas. None of these infected the Perfection peas. These nine strains of the virus represent considerable variation with regard to symptomatology, minor host preference, and ability to develop cytological evidence of the virus in the foliar cells of Vicia faba L. The original source plants from which they were isolated were Phaseolus vulgaris L., Pisum sativum L., Gladiolus gandavensis Van Houtte and Medicago sativa L. The failure of any of these nine strains to infect Perfection peas certainly supports Pierce's generalization that Bean virus 2 will not infect Perfection peas.

Table 1 includes data from tests made on Perfection peas in 1948 to determine whether there was a relation between age of plants at the time of inoculation and susceptibility to the virus. Our virus strains 306 and 401 were used in this test. Beginning March 17, when the pea plants averaged 2 1/2 inches, 19 days later when the plants averaged six inches, and finally March 31, when the plants were 13 inches tall, each virus strain was inoculated into six vigorous plants representing the respective age periods. A total of 36 plants were inoculated. There was no indication of infection.

The lots of Perfection peas listed in Table 2 were inoculated with our Bean virus 2 strains 306 from alfalfa and 401 from peas. These two strains were isolated from plants growing in the Milton, Oregon, area during the 1947 pea season. Their properties and host ranges are very similar. They were chosen for this experiment as being representative of the virus of Yellow Bean Mosaic that was scattered through the eighty-three thousand acres of peas grown in the area by the canners during the 1947 season. We know from field records and several other isolations that other essentially different strains were present. These two were used in this test because when inoculated to Alaska and Mardella peas they reproduced the average symptoms observed in the fields. In Vicia faba each produces a bright yellow coarse mottle accompanied by intense cytological virus-evidence (1). In red clover, Trifolium pratense L., each produces a mild diffused mottle. Each strain transfers readily to white sweet clover, Melilotus alba Mill., but attempts to perpetuate them in that host have failed since both strains, and especially 306, tend to kill the clover after six months residence in the inoculates. As shown in Table 2, these two strains of Bean virus 2 infected only two of the lots of Perfection-group peas tested. These were Early Perfectah and Davis Perfection. Only strain 306 transferred to Early Perfectah but both strains infected Davis Perfection. This susceptibility of Davis Perfection to these strains of Bean virus 2 correlates with the observed Yellow Bean Mosaic in fields planted with the Perfection group since subsequent study of the canners' planting records show that some of the fields we had listed as damaged by Yellow Bean Mosaic were planted with Davis Perfection and that a comparatively large acreage was planted with that variety.

From such results as those in Table 2, and from several former inoculations, it is concluded that the Early Perfection selections are not uniformly resistant to Yellow Bean Mosaic. Thus in the inoculations recorded in Table 2 only Early Perfectah was infected with either of the viruses and under the conditions in this test only strain 306 infected Early Perfectah. In a former test on an Early Perfection selection not listed in Table 2, neither 306 nor 401 induced infection but strains B and 203 from western Oregon sources infected the lot 7/20 and 9/20 respectively. One cannot generalize and say, "Early Perfection peas are resistant to Bean virus 2." It seems this problem will require local investigation by geneticists and plant pathologists to determine the selections of Early

Table 2. Inoculation of Perfection peas, selections and related varieties with two strains of Bean virus 2.

Corvallis, Oregon series of July 1948*

| Designation of lots of peas inoculated (The V-numbers are the identifying serial numbers of the Blue Mountain Cannery Co. that furnished the seeds in all V-number lots. Original sources of the seeds are also indicated.) | No. inoculates infected over no. inoculated with virus strain 306 | No. inoculates infected over no. inoculated with virus strain 401 |
|---|---|---|
| Asgrow Pride (V-24) Associated Seed Growers | 0/6 | 0/6 |
| Pride (V-164) Associated Seed Growers | 0/6 | 0/6 |
| Davis Perfection G. M. Whitney Company | 4/6 ..... | 3/6 |
| Early Perfection No. 1 (V-109) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Early Perfection No. 2 (V-110) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Early Perfection No. 1 Gallatin Valley (V-150) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Early Perfection No. 2 Gallatin Valley (V-151) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Early Perfection No. 3 Gallatin Valley (V-152) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Early Perfection Gallatin Valley (V-153) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Early Perfection 412 (V-192) Rogers Bros. Seed Company | 0/6 | 0/6 |
| Early Perfection (V-218) Mark Means Seed Company | 0/6 | 0/6 |
| Early Perfectah (V-35) Washburn Wilson Seed Company | 3/6 ... | 0/6 |
| Large Seeded Perfection No. 1 (V-111) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Large Seeded Perfection No. 2 (V-112) Gallatin Valley Seed Company | 0/6 | 0/6 |
| New Line Perfection (V-214) Canner Seed Corp. | 0/6 | 0/6 |

Table 2 continued

| Designation of lots of peas inoculated (The V-numbers are the identifying serial numbers of the Blue Mountain Cannery Co. that furnished the seeds in all V-number lots. Original sources of the seeds are also indicated) | No. inoculates infected over no. inoculated with virus strain 306 | No. inoculates infected over no. inoculated with virus strain 401 |
|---|---|---|
| Perfection (V-117) Rogers Bros. Seed Company | 0/6 | 0/6 |
| Perfection No. 94 (V-194) Rogers Bros. Seed Company | 0/6 | 0/6 |
| Perfection G. V.-hybrid (V-154) Gallatin Valley Seed Company | 0/6 | 0/6 |
| Perfection Stuart 5952 (V-64) Washburn and Wilson Seed Company | 0/6 | 0/6 |
| Perfectah (V-135) Washburn and Wilson Seed Company | 0/6 | 0/6 |
| Roger Large Seeded Perfection (V-99) Rogers Bros. Seed Company | 0/6 | 0/6 |
| Stuart Perfection (V-106) Michael Leonard Seed Company | 0/6 | 0/6 |
| Wilt Resistant Perfection No. 5 (V-63) Washington Idaho Seed Company | 0/6 | 0/6 |
| Wilt Resistant Perfection No. 7 (V-62) Washington Idaho Seed Company | 0/6 | 0/6 |
| Wilt Resistant Perfection G. M. Whitney Company | 0/6 | 0/6 |
| Wisconsin Perfection (V-193) University of Wisconsin | | |

* A very cool summer enabled us to maintain optimum temperature conditions for the duration of this experiment.

Perfection most likely to prove resistant to the various strains of Bean virus 2 present in the area where the peas are to be grown.

While studying cytological virus-evidence in peas it was observed that nucleoli were poorly developed or wanting in the foliar cells of Perfection peas. Originally McWhorter[4] showed and later Rich[5] confirmed that

4 McWhorter, Frank P. Isometric crystals produced by Pisum virus 2 and Phaseolus virus 2. Phytopath 31: 760-761. 1941.

5 Rich, Saul. The chemical nature and origin of Phaseolus virus 2. Science 107: 194. 1948.

intranuclear crystalline inclusions of Bean virus 2 are confined to the nucleoli within the plant cells where they occur. Rich showed a probable connection between "nucleolar material" and the development of crystalline inclusions characteristic of the virus. It was thought therefore that some correlation might exist between the poor development of nucleoli and the resistance to the virus evidenced by Perfection peas. Typical nucleoli in plant cells are readily shown by semi-vital staining with Trypan Blue. Using this test, foliar cells of all the lots listed in Table 2 were examined for nucleoli. In most cases none were seen, in no case were they well developed, and there was no correlation between the presence of nucleoli visible by means of the technique used and the susceptibility to Bean virus 2 evidenced by the inoculations.

The fact that neither of the Milton, Oregon, area strains of Bean virus 2 infected the lot listed as Wilt Resistant Perfection, Whitney source, is of special interest since a highly significant trial of this variety in one of the few Fusarium-wilt infested spots in Umatilla County, Oregon, proved this variety completely resistant to the pea wilt.

None of the western strains of Bean virus 2 we have tested has infected Perfection peas. This is of special interest since fourteen years have elapsed since Pierce[6] made his original generalization that Perfection peas are resistant to the virus. However, it would be unwise to conclude that Perfection peas are resistant to all strains of Yellow Bean Mosaic.

The emphasizing of either the susceptibility or resistance of horticultural varieties of plant species to defend or define virus species is an unstable practice. It is an unstable practice for two reasons: 1, uncontrollable variations in horticultural varieties and 2, the frequent finding by investigators of "new" strains of "old" viruses which refuse to remain within the minor host limits established for the parent virus. The above data are presented therefore not to further define Bean virus 2, but for the immediate aid of breeders of peas who must consider Yellow Bean Mosaic a serious problem in Oregon and Washington pea fields.

OREGON AGRICULTURAL EXPERIMENT STATION, CORVALLIS

[6] Pierce, Walter H. Viroses of the bean. Phytopath. 24: 81-115. 1934.

# OCCURRENCE OF VIRUS-FREE CUTTINGS FROM SWEET-CLOVER INFECTED WITH WOUND-TUMOR VIRUS

Karl Maramorosch[1]

From a number of sweet clover plants (Melilotus sp.) infected in 1945 with the wound-tumor virus (Aureogenus magnivena Black)[2], four showing the greatest tumor response on stem and roots were selected. Because the roots of these plants were so tumorous that the plants grew very poorly, they were maintained by grafting scions onto medium sized healthy plants with good roots. Subsequently, the grafted plants were pruned in such a way that the top of the plant consisted of scion material only. In propagating the four plants as clones in this manner, scions were selected from the tips of the branches where no tumors had yet developed. In spite of this the grafted scions always developed tumors and the roots of the healthy stock also eventually became tumorous.

In February 1948 cuttings from three of these four clones were made for an experiment on the effect of controlled temperature on disease expression. Plants from the cuttings were grown at different temperatures and it was found that stem and root tumors develop well at 26° C. However, after three months at 26° C. some cuttings remained healthy in appearance. After being kept in the greenhouse for five additional months they were examined again without finding any root or stem tumors. The plants are apparently free from the virus.

The data indicate that under certain conditions the virus may not invade the tips of young branches and that cuttings from such tips are therefore healthy. If this is the explanation for these preliminary observations, the case would be similar to that reported for spotted wilt in dahlia by Dr. F. O. Holmes[3].

BROOKLYN BOTANIC GARDEN, BROOKLYN, NEW YORK

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[1] Fellow in Cancer Research, American Cancer Society, under an award by the Committee on Growth of the National Research Council.

[2] Black, L. M. A virus tumor disease of plants. Amer. Jour. Bot. 32: 408-415. 1945.

[3] Holmes, F. O. Elimination of spotted wilt from a stock of dahlia. Phytopath. 38: 314. 1948.

# PREVALENCE OF CROWN RUST AND HELMINTHOSPORIUM BLIGHT IN FLORIDA, JANUARY, 1949

S. C. Litzenberger

During the latter part of January, 1949, a thorough survey was made of the prevalence of two major diseases of oats in Florida, crown rust (Puccinia coronata avenae Eriks. & E. Henn.) and Helminthosporium or Victoria blight (Helminthosporium victoriae Meehan & Murphy). The survey was made by examining field and nursery plantings which were located generally north and west of Brooksville. The major locations covered by the survey were Brooksville, Leesburg, Gainesville, Live Oak, Monticello, Quincy, Marianna, De Funiak Springs, and Milton.

Helminthosporium blight and crown rust Race 45 or similar races were found present on susceptible varieties at all locations checked. The severity of infection centered around Gainesville and decreased somewhat to the northward. Varieties such as Fulgrain which possess the highly resistant reaction of Victoria to crown rust showed extensive injury from the blight disease. Reduced stands were also apparent in many cases, especially if the plants were being grazed or clipped. Florida 167, Suwannee, Coker's 45-67 and similar varieties known to be susceptible to Race 45 were found resistant to blight but completely susceptible to the prevalent crown rust. Strains of Red Rustproof (Tifton 14, Nortex 107, Appler, etc.) were also found to be resistant to blight, but they were moderately susceptible to the crown rust present. Only Camellia and the several new experimental hybrids developed cooperatively by the U. S. Department of Agriculture and the Florida Agricultural Experiment Stations showed good resistance to both diseases. Until superior disease resistant oat varieties are released to Florida growers Camellia and the various strains of Red Rustproof continue to offer the best possibilities of an oat crop both for grazing and grain purposes.

Just what the extensive prevalence of Race 45 of crown rust means to oat growing areas to the north of us is problematical. If the mild winter and moist weather continues to prevail in the southeastern part of the United States crown rust is expected to continue to develop and may serve to inoculate the more important oat-growing regions to the north as the season progresses. Although Race 45 was first observed in Florida in 1937 it had not reached epiphytotic proportions during the regular crop season in this area until 1948. As yet such damage has been confined to certain areas of the South. Severe attacks have been observed in Iowa on fall-emerged volunteer oats in recent years. If Race 45 should become prevalent during the regular growing season serious damage could result to the numerous Bond strains now being grown in the oat growing areas to the north.

FLORIDA AGRICULTURAL EXPERIMENT STATION, GAINESVILLE

# SOME NEW DISEASE RECORDS OF GRAMINEAE IN THE WESTERN UNITED STATES -- II[1]

Roderick Sprague and Jack P. Meiners[2]

For several years the writers, and George W. Fischer, have been assembling information on the host range and geographical distribution of parasitic fungi on Gramineae in the western United States. The compiled data have now reached considerable magnitude. Until this list can possibly be issued as a unit it seems advisable to record additions as they are determined. The following pages include those additions to the host range, by States, which have been determined since our last reports[3,4]. In other words each one of these citations represents the first report for the particular fungus on the particular host in the States given.

In addition to a number of more or less local trips one lengthy sojourn was made into Colorado and return. Conditions were so favorable for leafspot development this year that it has not been possible to complete determination of all of the immense number of specimens collected. In addition, the data on Ustilaginales will be treated as a unit by Fischer, who also aided the writers in collecting the leafspot and rust fungi and who organized the trip to Colorado. We are also indebted to Charles Gardner Shaw and students for aid in collecting material in the Inland Empire of Washington and Idaho.

AGROPYRON DASYSTACHYUM (Hook.) Scribn.

Bends, cause undetermined -- Madison River Valley, Mont.
Claviceps purpurea (Fr.) Tul. -- North of Mack's Inn, Ida.
Erysiphe graminis DC. -- ditto.
Puccinia pattersoniana Arth. -- ditto

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[1]Cooperative investigations between the Washington Agricultural Experiment Station and the Division of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, United States Department of Agriculture. Published with the approval of the Director of the Washington Experiment Station as Paper No. 823

[2]Associate Pathologist, Division of Plant Pathology, Washington Agricultural Experiment Station and Agent, Division of Forage Crops and Diseases, U.S.D.A.

[3]Sprague, R., George W. Fischer, and Jack P. Meiners. Some new disease records of Gramineae in the Western United States. U.S. Bureau of Plant Industry, Soils, and Agricultural Engineering Plant Dis. Reptr. 32: 98-114. Mar. 15, 1948

[4]Sprague, R., and Jack P. Meiners. Additional parasitic fungi on Gramineae in the Inland Empire. U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering Plant Dis. Reptr. 32: 245-247. June 15, 1948

AGROPYRON ELMERI Scribn.
Rhynchosporium secalis (Oud.) J.J. Davis -- Pullman, Wash.

AGROPYRON INERME (Scribn. & Sm.) Rydb.
Puccinia pattersoniana Arth. -- Carey, Ida.; Logan Canyon, Utah.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

AGROPYRON INTERMEDIUM (Host.) Beauv.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

AGROPYRON MICHNOI Roshev.
Fusarium acuminatum Ell. & Ev. -- Troy, Ida.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

AGROPYRON ORIENTALE var. LASIANTHUM (Boiss.) Boiss.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

AGROPYRON REPENS (L.) Beauv.
Erysiphe graminis DC. -- Priest Lake, Ida.
Puccinia graminis Pers. -- Brady's Gulch, Ida.; Colfax, Wash.
Pythium debaryanum Hesse -- Dyer Hill, Wash.
P. graminicola Subrm. -- Dyer Hill, Wash.
Rhizoctonia solani Kuehn -- Kendrick, Ida.

AGROPYRON SMITHII Rydb.
Ascochyta sorghi Sacc. -- Roosevelt Natl. For., Colo.
Bacterium agropyri (O'Gara) Stapp -- ditto
Erysiphe graminis DC. -- Near Chimney Rock on Wyoming side of State line
Pseudomonas coronafaciens var. atropurpureum (Reddy & Godkin) Stapp -- Craig, Colo.
Puccinia montanensis Ellis -- Arco, Ida.
Pythium graminicola Subrm. -- Dyer Hill, Wash.
Septoria avenae f. triticea T. Johnson -- Near Virginia City, Mont.

AGROPYRON SPICATUM (Pursh) Scribn. & Sm.
Bacterium agropyri (O'Gara) Stapp -- Targhee Pass, Ida.
Bends, cause unknown -- Pipestone Pass, Mont.
Claviceps purpurea (Fr.) Tul. -- Deary, Juliaetta, Troy, Ida.
Dilophospora alopecuri (Fr.) Fr. -- Sheep Creek, Utah (no nematodes present).
Fusarium acuminatum Ell. & Ev. -- Juliaetta, Kendrick, Ida.
Puccinia glumarum (Schm.) Eriks. & Henn. -- Tensed, Ida.
P. graminis Pers. -- Roosevelt Natl. For., Colo.
P. pattersoniana Arth. -- Mack's Inn, Ida.; West Yellowstone, Mont.
Scolecotrichum graminis Fckl. -- 6 miles south of Craig, Colo.
Selenophoma donacis var. stomaticola (Baueml.) Sprague & A. C. Johnson -- Near Chimney Rock, Colo.
Typhula itoana Imai -- Mansfield, Wash.

AGROPYRON SUBSECUNDUM (Lk.) Hitchc.
Bacterium agropyri (O'Gara) Stapp -- Pipestone Pass, Mont.
Claviceps purpurea (Fr.) Tul. -- Fremont Co., Ida.; Twin Bridges, Mont.
Puccinia pattersoniana Arth. -- Logan Canyon, Utah
Rhynchosporium secalis (Oud.) J.J.Davis -- Pullman, Wash.
Scolecotrichum graminis Fckl. -- Logan Canyon, Utah

AGROPYRON SUBSECUNDUM var. ANDINUM (Scribn. & Sm.) Hitchc.
Erysiphe graminis DC. -- Sand Creek Pass, Colo.
Selenophoma obtusa Sprague & A. G. Johnson -- Monarch Pass, Colo.

AGROPYRON TRACHYCAULUM (Lk.) Malte
Aschchyta agropyrina (Fairm.) Trotter -- Mesa Lake, Colo.
A. utahensis Sprague -- Climax, Skyway, Colo.; Togwatee Pass, Wyo.
Bacterium agropyri (O'Gara) Stapp -- Pipestone Pass, Mont.
Claviceps purpurea (Fr.) Tul. -- Twin Bridges, Mont.; Logan, Utah
Erysiphe graminis DC. -- Sand Creek Pass, Colo.; Madison River, Mont.; Uinta Mts., Utah
Hendersonia graminis McAlp. -- Mesa Lake, Colo.
Puccinia montanensis Ellis -- Gooding, Ida.
Rhynchosporium secalis (Oud.) J.J.Davis -- Skyway, Colo.
Scolecotrichum graminis Fckl. -- Craig, Colo.; Elk Park Creek, Utah

AGROPYRON TRICHOPHORUM (Lk.) Richt.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

AGROSTIS ALBA L.
Ascochyta sorghi Sacc. -- Idaho Co., Ida.
Erysiphe graminis DC. -- Arco, Ida.
Ophiobolus graminis Sacc. -- Donnelly, Ida.
Puccinia coronata Corda -- Idaho Co., Ida.
Septogloeum oxysporum Sacc., Bomm. and Rouss. -- Woodruff, Utah; Roosevelt Natl. For., Colo.

AGROSTIS EXARATA Trin.
Erysiphe graminis DC. -- Medicine Bow Natl. For., Wyo.
Ophiobolus graminis Sacc. -- Brady's Gulch, Ida.
Septoria avenae Frank -- Elsie, Oreg.

AGROSTIS OREGONENSIS Vasey
Helminthosporium stenacrum Drechsl. -- New Meadows, Ida.
Scolecotrichum graminis Fckl. -- Beaver Creek Ranger Sta., Ida.

AGROSTIS ROSSEA Vasey
Septoria calamagrostidis Vasey -- Medicine Bow Natl. For., Wyo.

AGROSTIS SCABRA Willd.
Helminthosporium stenacrum Drechsl. -- Skyway, Colo.
Scolecotrichum graminis Fckl. -- South Fork of Cache la Poudre River, Colo.; Uinta Mts., Utah.

ALOPECURUS GENICULATUS L.
Scolecotrichum graminis Fckl. -- Long Beach, Wash.; Genessee, Ida.

ANDROPOGON FURCATUS Muhl.
Colletotrichum graminicola (Ces.) Wils. -- Buckhorn Creek, Colo.

ARRHENATHERUM ELATIUS (L.) Presl
Pythium debaryanum Hesse -- Dyer Hill, Wash.
P. graminicola Subrm. -- Dyer Hill, Wash.
Septogloeum oxysporum Sacc., Bomm. & Rouss. -- Rochester, Wash.

AVENA SATIVA L.
Pythium debaryanum Hesse -- Grand Valley, Colo.

BECKMANNIA SYZIGACHNE (Steud.) Fern.
Erysiphe graminis DC. -- Arco, Ida.
Scolecotrichum graminis DC. -- Arco, Ida.

BOUTELOUA GRACILIS (H.B.K.) Lag.
Fusarium acuminatum Ell. & Ev. -- Dyer Hill, Wash.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

BROMUS ANOMALUS Rupr.
Puccinia coronata Corda -- Togwatee Pass, Wyo.

BROMUS BRIZAEFORMIS Fisch. & Mey.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

BROMUS CARINATUS Hook. & Arn.
Ascochyta hordei Hara -- Spokane Co., Wash.
Bends, cause unknown -- Skyway, Colo.; Logan Canyon, Utah
Claviceps purpurea (Fr.) Tul. -- Shoshone Natl. For., Wyo.
Erysiphe graminis DC. -- Near Leadville, Colo.
Ophiobolus graminis Sacc. -- Brady's Gulch, Ida.
Ovularia pusilla (Ung.) Sacc. & D.Sacc. -- South Fork Clearwater River, Ida.
Pseudomonas coronafaciens var. atropurpureum (Reddy & Godkin) Stapp -- Craig, Colo.
Puccinia graminis Pers. -- Brady's Gulch, Ida.
Pythium graminicola Subrm. -- Dyer Hill, Wash.
Rhynchosporium secalis (Oud.) J.J.Davis -- Skyway, Colo.
Septogloeum oxysporum Sacc., Bomm. & Rouss. -- On Highway 91 about 8 miles from Leadville, Colo.
Septoria jaculella Sprague -- Skyway, Mesa Lake, Grand Mesa, Colo.
Typhula idahoensis Remsb. -- Granite Mtn., Ida.

BROMUS CILIATUS L.
Rhynchosporium secalis (Oud.) J.J.Davis -- Skyway, Colo.
Scolecotrichum graminis Fckl. -- Shoshone Natl. For., Wyo.
Septoria jaculella Sprague -- Madison River, Mont.
Stagonospora bromi Sacc. -- Roosevelt Natl. For., Colo.

BROMUS COMMUTATUS Schrad.
Puccinia graminis Pers. -- Brady's Gulch, Ida.

BROMUS ERECTUS Huds.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

BROMUS FRONDOSUS (Shear) Stand. & Wootn.
Rhynchosporium secalis (Oud.) J.J.Davis -- Medicine Bow Natl. For., Wyo.
Scolecotrichum graminis Fckl. -- Silver Plume, Colo.
Stagonospora bromi Sm. & Hemsb. -- Silver Plume, Colo.

BROMUS INERMIS Leyss
Claviceps purpurea (Fr.) Tul. -- Kendrick, Ida.
Pseudomonas coronafaciens var. atropurpureum (Reddy & Godkin) Stapp -- Hamilton, Colo.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

BROMUS JAPONICUS Thunb.
Ophiobolus graminis Sacc. -- Brady's Gulch, Ida.
Puccinia graminis Pers. -- Brady's Gulch, Ida.

BROMUS MADRITENSIS L.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

BROMUS PURGANS L.
Rhynchosporium secalis (Oud.) J.J.Davis -- Mesa Lake, Colo.
Scolecotrichum graminis Fckl. -- Mesa Lake, Roosevelt Natl. For., Colo.

BROMUS STERILIS L.
Cercosporella herpotrichoides Fron -- Juliaetta, Ida.

BROMUS TECTORUM L.
Cercosporella herpotrichoides Fron -- Juliaetta, Ida.
Ophiobolus graminis Sacc. -- South Fork of the Clearwater River, Ida.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

BROMUS VULGARIS (Hook.) Shear
Ophiobolus graminis Sacc. -- Mica Peak, Wash.
Puccinia rubigo-vera (DC.) Wint. -- Teton Pass, Wyo.

CALAMAGROSTIS CANADENSIS L.
Colletotrichum graminicola (Ces.) Wils. -- Beaver Creek, Ida.
Ovularia pusilla (Ung.) Sacc. -- Baker Hole Camp, Mont.
Septogloeum oxysporum Sacc., Bomm. & Rouss. -- Uinta Mts., Utah

CALAMAGROSTIS INEXPANSA A. Gray
Claviceps purpurea (Fr.) Tul. -- Twin Bridges, Mont.
Puccinia coronata Corda -- ditto

CALAMAGROSTIS KOELERIOIDES Vasey
Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G.Johnson -- Medicine Bow Natl. For., Wyo.

CALAMAGROSTIS RUBESCENS Buckl.
Colletotrichum graminicola (Ces.) Wils. -- Hebgen Dam on Madison River, Mont.
Erysiphe graminis DC. -- ditto
Heterosporium avenae Oud. -- ditto

CALAMAGROSTIS SCRIBNERI Beal
Puccinia coronata Corda -- Pipestone Pass, Mont.
Spermospora subulata (Sprague) Sprague -- Below Teton Pass, Wyo.

CATABROSA AQUATICA (L.) Beauv.
Puccinia poae-sudeticae (West.) Jørstd. -- Targhee Natl. For., Ida.; Madison River, Mont.

DACTYLIS GLOMERATA L.
Bends, cause unknown -- Skyway, Colo.
Mycelia sterilia (a white basidiomycetous growth at the base of the plants accompanied by considerable leaf necrosis; no sclerotia present) -- Logan Canyon, Utah
Pythium graminicola Subrm. -- Dyer Hill, Wash.
Scolecotrichum graminis Fckl. -- 7 miles south of Craig, Colo.; Logan Canyon, Utah

DANTHONIA CALIFORNICA Boland
Colletotrichum graminicola (Ces.) Wils. -- Rochester, Wash.

DESCHAMPSIA CAESPITOSA (L.) Beauv.
Spermospora subulata (Sprague) Sprague -- Warm River, Ida.
Stagonospora vexatula Sacc. -- Plummer, Ida.

DESCHAMPSIA DANTHONIOIDES (Trin.) Munro
Helminthosporium sp. -- Ford, Ida.
Ophiobolus graminis Sacc. -- ditto
Puccinia graminis Pers. -- Brady's Gulch, Ida.

DESCHAMPSIA ELONGATA (Hook.) Munro
Typhula idahoensis Remsb. -- Granite Mtn., Ida.

ELYMUS CANADENSIS L.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

ELYMUS CONDENSATUS Presl
Bends, cause unknown -- Inkam, Ida.; Axial, Colo.
Claviceps purpurea (Fr.) Tul. -- Western Colo. (common); Logan Canyon, Utah.
Fusarium culmorum (W.G.Sm.) Sacc. -- Smith Ferry, Ida.
Septogloeum oxysporum Sacc., Bomm. & Rouss. -- 6 miles south of Craig, Colo.

ELYTUS GLAUCUS Buckl.
Bends, cause unknown -- Medicine Bow Natl. For., Wyo.
Claviceps purpurea (Fr.) Tul. -- Whitebird Grade, Ida.
Dilophospora alopecuri (Fr.) Fr. -- Teton Pass, Wyo. (no nematodes present).
Ophiobolus graminis Sacc. -- Brady's Gulch, Ida.
Rhynchosporium secalis (Oud.) J.J.Davis -- South Fork of the Clearwater River, Ida.; Medicine Bow Natl. For., Wyo.
Scolecotrichum graminis Fckl. -- Skyway, Colo.; Medicine Bow Natl. For., Wyo.
Selenophoma donacis (Pass.) Sprague & A.G.Johnson -- Medicine Bow Natl. For., Wyo.
Septogloeum oxysporum Sacc., Bomm. & Rouss. -- Rainier Natl. Park, Wash.; Kendrick, Ida.
Septoria avenae Frank f. sp. triticea T.Johnson -- Latah Co., Ida.
Typhula itoana Imai -- Moscow, Ida.

ELYMUS JUNCEUS Fisch.
Claviceps purpurea (Fr.) Tul. -- Puyallup, Wash.

ELYMUS MACOUNII Vasey (Hybrid)
Scolecotrichum graminis Fckl. -- Loyd, Colo.

FESTUCA ELATIOR L.
Phoma sp. -- Post Falls, Ida.
Puccinia graminis Pers. -- Kendrick, Ida.
Septoria tenella Cooke & Ellis -- 6 miles west of Colfax, Wash.

FESTUCA ELATIOR L. var. ARUNDINACEA (Schreb.) Wimm.
Cercospora festucae Hardison -- Corvallis, Oreg. (For the record it should be noted that Rampton collected a specimen July 10, 1942. Hardison has noted this fungus at Corvallis but our records did not include it, until mentioned by Hardison in a letter to Sprague.)
Helminthosporium dictyoides Drechsl. -- Pullman, Wash.

FESTUCA IDAHOENSIS Elmer
Ovularia pusilla (Ung.) Sacc. & D. Sacc. -- Idaho Co., Ida.

(Festuca idahoensis)
Phoma sp. -- Desmet, Targhee Pass, Ida.; Targhee Pass, Mont.
Pythium graminicola Subrm. -- Dyer Hill, Wash.
Septoria tenella Cooke & Ellis -- Pullman, Wash.

FESTUCA KINGII (S.Wats.) Cassidy
Claviceps purpurea (Fr.) Tul. -- Chimney Rock, Colo.; Medicine Bow Natl. For., Shoshone Natl. For., Wyo.
Selenophoma everhartii (Sacc. & Sydow) Sprague & A.G.Johnson -- Medicine Bow Natl. For., Wyo.

FESTUCA OVINA L.
Septoria tenella Cooke & Ellis -- Pullman, Wash.

FESTUCA RUBRA L.
Septoria tenella Cooke & Ellis -- Mt. Spokane, Pullman, Wash.
Spermospora subulata (Sprague) Sprague -- Rochester, Wash.

FESTUCA SUBULATA Trin.
Colletotrichum graminicola (Ces.) Wils. -- South Fork Clearwater River, Ida.
Phyllosticta sp. -- ditto
Puccinia crandallii Pam. & Hume -- ditto

GLYCERIA ELATA (Nash) Hitchc.
Septoria avenae Frank -- Teton Pass, Wyo.
Stagonospora foliicola (Bres.) Bubák -- 10 miles north of Glendevey, Colo.

GLYCERIA GRANDIS S. Wats.
Septoria avenae Frank -- Medicine Bow Natl. For., Wyo.

GLYCERIA PAUCIFLORA Presl
Scolecotrichum graminis Fckl. -- Teton Pass, Wyo.
Septoria glycericola Sprague -- Blue Mesa, Colo.; Teton Pass, Wyo.

GLYCERIA STRIATA (Lam.) Hitchc.
Septoria glycericola Sprague -- Tucanon Gorge, Wash.

HORDEUM BREVISUBULATUM (Trin.) Lk.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

HORDEUM JUBATUM L.
Bacterium agropyri (O'Gara) Stapp -- Madison River, near Lyon, Mont.
Erysiphe graminis DC. -- Sand Creek Pass, Colo.
Septoria nodorum Berk. -- Belfield, N. Dak.

HORDEUM JUBATUM var. CAESPITOSUM (Scribn.) Hitchc.
Scolecotrichum graminis Fckl. -- Loyd, Colo.

HORDEUM MURINUM L.
Puccinia glumarum (Schm.) Eriks. & Henn. -- Franklin Co., Wash.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

HORDEUM NODOSUM L.
Erysiphe graminis DC. -- Sand Creek, Colo.

HORDEUM VULGARE L.
Pythium debaryanum Hesse -- Grand Valley, Colo.

KOELERIA CRISTATA (L.) Pers.
Claviceps purpurea (Fr.) Tul. -- Fremont Co., Ida.
Curvularia geniculata (Ell. & Tr.) Boed. -- Rochester, Wash.
Fusarium nivale (Fr.) Sacc. -- South Fork Clearwater River, Ida.
Helminthosporium avenae Eidam -- Rochester, Wash.
Heterosporium avenae Eidam -- ditto
Septoria calamagrostidis f. koeleriae (Cocc. & Mor.) Sprague -- Mesa Lake, Colo.
Septoria quinqueseptata Sprague -- Rochester, Wash.

MELICA BULBOSA Geyer
Epichloë typhina (Pers.) Tul. -- Umatilla Natl. For., Wash.

MELICA SPECTABILIS Scribn.
Spermospora subulata (Sprague) Sprague -- Togwatee Pass, Wyo.

MELICA SUBULATA (Griseb.) Scribn.
Scolecotrichum graminis Fckl. -- Kaniksu Natl. For., Ida.

MUHLENBERGIA ASPERIFOLIA (Nees & Mey.) Par.
Puccinia luxuriosa Sydow -- Butte, Mont.

ORYZOPSIS HYMENOIDES (Roem. & Schult.) Rick.
Fusarium acuminatum Ell. & Ev. -- Dyer Hill, Wash.
Helminthosporium sativum P.K.B. -- Dyer Hill, Wash.
Pythium graminicola Subrm. -- Dyer Hill, Wash.

PHLEUM ALPINUM L.
Heterosporium phlei Gregory -- Skyway, Colo.
Scolecotrichum graminis Fckl. -- ditto

PHLEUM PRATENSE L.
Bends, cause unknown -- Brady's Gulch, Ida.
Gloeosporium sp. (undescribed) -- South Prairie, Wash.
Ophiobolus graminis Sacc. -- Brady's Gulch, Ida.
Pythium graminicola Subrm. -- Dyer Hill, Wash.
Scolecotrichum graminis Fckl. -- 7 miles south of Craig, Colo.
Selenophoma donacis var. stomaticola (Baueml.) Sprague & A.G. Johnson -- 5 miles south of Craig, Colo.

POA ALPINA L.
Gloeosporium sp. (undescribed) -- Monarch Pass, Colo.
Scolecotrichum graminis Fckl. -- Medicine Bow Natl. For., Wyo.

POA ANNUA L.
Corticium fuciforme (McAlp.) Wak. -- Bremerton, Wash.

POA AMPLA Merr.
Bends, cause unknown -- Fremont Co., Ida.

POA BULBOSA L.
Helminthosporium vagans Drechsl. -- Pullman, Wash.

POA CANBYI Vasey
Claviceps purpurea (Fr.) Tul. -- Mack's Inn, Ida.
Scolecotrichum graminis Fckl. -- Sand Creek, Colo.
Septoria macropoda var. grandis Sprague -- Umatilla Natl. For., Wash.

POA COMPRESSA L.
Puccinia poae-sudeticae (West.) Jørstd. -- Medicine Bow Natl. For., Wyo.
Selenophoma donacis var. stomaticola (Baueml.) Sprague & A.G. Johnson -- Skyway, Colo.

POA GRACILLIMA Vasey
Claviceps purpurea (Fr.) Tul. -- Warm River, Ida.
Erysiphe graminis DC. -- Summit of highway, Medicine Bow Natl. For., Wyo.; Umatilla Natl. For., Wash.
Puccinia poae-sudeticae (West.) Jørstd. -- Warm River, Ida.
Scolecotrichum graminis Fckl. -- ditto
Septoria macropoda var. grandis Sprague -- Umatilla Natl. For., Wash.

POA INTERIOR Rydb.
Scolecotrichum graminis Fckl. -- Medicine Bow Natl. For., Wyo.

POA NERVOSA (Hook.) Vasey
Erysiphe graminis DC. -- Medicine Bow Natl. For., Wyo.

POA NEVADENSIS Vasey
Selenophoma donacis (Pass.) Sprague & A.G.Johnson -- Pullman, Wash.

POA PALUSTRIS L.
Erysiphe graminis DC. -- Blue Mesa, Sand Creek, Cache la Poudre River, Colo.; Sheep Creek, Utah

POA PRATENSIS L.
Septoria oudemansii (Oud.) Sacc. -- Blue Mesa, Colo.

POA REFLEXA Vasey & Scribn.
Puccinia poae-sudeticae (West.) Jørstd. -- Common in northern Colorado and western Wyoming.

POA SECUNDA Presl
Pythium debaryanum Hesse -- Dyer Hill, Wash.

PUCCINELLIA NUTTALLIANA (Presl) Fern. & Weath.
Bends, cause unknown -- Twin Bridges, Mont.
Puccinia rubigo-vera (DC.) Wint. -- Twin Bridges, Mont.

SCHEDONNARDUS PANICULATUS (Nutt.) Trel.
Fusarium acuminatum Ell. & Ev. -- Mandan, N. Dak.

SECALE CEREALE L.
Typhula itoana Imai -- Mansfield, Wash.

SITANION JUBATUM J.G.Smith
Ascochyta sorghi Sacc. -- Withrow, Wash.

SPOROBOLUS CRYPTANDRUS (Torr.) A. Gray
Char spot, undetermined -- Buckhorn Creek, Colo.

STIPA COLUMBIANA Macoun
Puccinia scaber (Ell. & Ev.) Barth. -- Medicine Bow Natl. For., Wyo.; McCall, Ida.
Scolecotrichum graminis Fckl. -- Targhee Pass, Mont.
Selenophoma obtusa Sprague & A.G.Johnson -- High Prairie, Wash.

STIPA COMATA Trin. & Rupr.
Puccinia stipae Arth. -- Blackfoot, Ida.
Scolecotrichum graminis Fckl. -- Craig, Colo.

STIPA LEMMONII (Vasey) Scribn.
Fusarium nivale (Fr.) Ces. -- Umatilla Natl. For., Wash.
Scolecotrichum graminis Fckl. -- ditto
Selenophoma donacis (Pass.) Sprague & A.G.Johnson -- ditto

STIPA LETTERMANII Vasey
Claviceps purpurea (Fr.) Tul. -- 7 miles upstream from Colfax, Wash.
Scolecotrichum graminis Fckl. -- Teton Pass, Wyo.; Logan Canyon, Utah

STIPA ROBUSTA Scribn.
Ascochyta hordei Hara -- Cedaredge, Colo.

STIPA WILLIAMSII Scribn.
Puccinia scaber Arth. -- McCall, Ida.

TRISETUM CANESCENS Buckl.
Ascochyta sorghi Sacc. -- South Fork of the Clearwater River, Ida.

TRISETUM SPICATUM (L.) Richt.

Ovularia pusilla (Ung.) Sacc. & D.Sacc. -- 3 miles west of Togwatee Pass, Wyo.

Puccinia coronata Corda -- Mesa Lake, Colo.

Puccinia poae-sudeticae (West.) Jørstd. -- Medicine Bow Natl. For., Wyo.

Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G.Johnson -- Monarch Pass, Colo.

Selenophoma donacis var. stomaticola (Baueml.) Sprague & A.G. Johnson -- Medicine Bow Natl. For., Wyo.

Septoria calamagrostidis (Lib.) Sacc. -- Grand Mesa, Colo.

TRISETUM WOLFII Vasey

Selenophoma everhartii (Sacc. & Syd.) Sprague & A.G.Johnson -- Medicine Bow Natl. For., Wyo.

TRITICUM AESTIVUM L.

Selenophoma donacis (Pass.) Sprague & A.G.Johnson -- Near Moscow Mts., Ida. Common in Whitman County, Wash.

Septoria avenae f. sp. triticea T.Johnson -- 6 miles west of Colfax, Wash.

WASHINGTON AGRICULTURAL EXPERIMENT STATION AND U. S. BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING

# DISEASE FORECASTING AS COMMON SENSE[1]

Neil E. Stevens

Bulletin 450 by H. J. Franklin and C. E. Cross of the Massachusetts Agricultural Experiment Station, just issued, furnishes the background for an important long-time experiment in disease forecasting. As this is a phase of plant disease control in which I am much interested, some comments may be forgiven. They may possibly even be useful.

The object of disease forecasting is well known. It is to reduce, materially, the cost of disease control without greatly increasing the chance of serious losses from disease. There are, in the United States, a considerable number of sporadic diseases on cultivated crops. In some years a sporadic diseases causes losses so severe that control measures pay for themselves many times over. In other years, however, spraying is a waste of time and materials, as well as a source of possible injury. It seems no more than common sense to try to develop methods of telling in advance whether such spraying will pay. The Plant Disease Survey of the U. S. Department of Agriculture has recently initiated a rather extensive project covering this type of work on several diseases.

## Cape Cod

The cranberry industry on Cape Cod seems particularly favorable for such an attempt. In the opinion of most of those familiar with conditions, general spraying for the control of fruit rot is not necessary or profitable every year. There are certain bogs where spraying is necessary every year. These areas are mostly well known to growers and managers. Also, the committee of the New England Cranberry Sales Company, of which Mr. Trufant is chairman, has recently published a useful rule for picking out such bogs. Dr. Franklin's experiment in forecasting attempts to go further and to meet the general situation.

There are now on record contemporary estimates of the keeping quality of the cranberry crop in this area from 1912 to 1947. Of these 36 crops, 5 were rated very poor, 4 as poor, 5 as fair, and 22 either good or very good. Poor keeping quality is largely a matter of abundance of decay-producing fungi. Thus an estimate of keeping quality is an estimate of disease incidence. In my opinion, then, the record shows that general spraying for the control of fruit rots would have paid exceptionally well in 5 years, well in 4 years, been of doubtful value in 5, and would probable have done more harm than good in 22. No businessman should be advised to spray four years for reasonable assurance of return in only one.

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[1] Reprinted with permission from Cranberries (Wareham, Mass.) 13 (9): 17-19. Jan. 1949.

If he is so advised, he will probably not follow that advice.

It is well known that everyone is a good quarterback on Monday morning. So I should like to review the potential usefulness of Dr. Franklin's experiment in terms of what might have been accomplished if the experiment had been begun a quarter of a century ago. By the early spring of 1923 there was evidence in hand to indicate that an abnormally warm spring in this area would usually be followed by poor keeping quality in the cranberry crop. This hypothesis has been abundantly confirmed in the past 25 years. Beginning with 1923, there have been 3 crops rated as very poor, 2 as poor, 4 as fair and 16 as good. In other words, adequate spraying would have paid very well in 5 years, might have paid for itself in 4, and would have been worse than useless in 16.

## Forecasts

How would forecasts based on the single factor then recognized as important have worked out? That would depend, of course, on the caution used by the forecaster. If he had leaned toward the thrifty side and recommended spraying only after the warmest seasons--0 in column 5 of Dr. Franklin's table No. 1, the growers who followed his advice would have sprayed in 1931, 1933 and 1942, all years of very heavy disease losses. They would also have sprayed in 1929, a year of severe losses, and in 1946 when spray for fruit rots would not have been needed. They would have missed spraying in 1930 when it would have been useful. The other 19 years they would have saved their spray money and with only a single exception been glad they did so. The record would thus stand, 5 recommendations to spray, all but one of which were fully justified, 20 recommendations against spraying here again with only one miss.

The experiment in forecasting the keeping quality of the cranberry crop of Plymouth County which was started in 1923 seemed venturesome at the time. Actually, as the results proved it was almost too easy. Certainly, it was much easier than that now being undertaken by Dr. Franklin. Those earlier forecasts were intended merely to be of use in handling the crop and were made in September. By that time much more information regarding weather during the growing season was available than there is on June 15 when the forecasts to be used in planning spray programs will be made.

In this discussion of what seems to me the possibilities of a useful cranberry disease forecast, as early as June, I have attempted no analysis of the results of Dr. Franklin's further study. It should add to the accuracy of forecasts based on a single factor. I sincerely hope that enough growers will act on the basis of his forecasts to give us a real check on their accuracy.

(UNIVERSITY OF ILLINOIS, URBANA)

# BACTERIAL WILT ON SWEET CORN, 1945-1948

Adrian W. Poitras and Neil E. Stevens

Reports on bacterial wilt [Pseudomonas stewarti] of sweet corn in the Northeastern States for the years 1945-1948 were recently requested from experienced observers. This was done for purposes of comparison with conditions recently observed in Illinois. The results constitute a record of the behavior of this disease for a four-year period.

MASSACHUSETTS

"My survey notes as well as my memory reveal no reports or observations of sweet corn wilt during the years, 1945-48. The disease simply seems to have disappeared -- and I have probed into home gardens a great deal as well as in commercial plantings.

It is a fact, however, that most home gardeners as well as the commercial growers have been planting the hybrid sweet corns. Still, I recall seeing Golden Bantam and Golden Sunshine this summer, and in Plymouth County too, without any signs or wilt. Signs of flea beetle feeding have been present as usual." -- O. C. Boyd

CONNECTICUT

"About the only thing I know about bacterial wilt of sweet corn is that it has been practically non-existent in Connecticut during the last four years. At least we have not had it reported, nor have I seen it in the field. I think the backyard gardeners, as well as the commercial growers, are all growing the hybrid corns which are resistant to this disease. As a matter of fact, we had to send away for a culture of this organism to use on some inoculation work in the greenhouse." -- E. M. Stoddard

NEW YORK

"In recent years we have had almost no reports of Stewart's disease in corn in New York State. This may be due to weather, but could also be the result of resistant varieties.

"1945: No wilt observed or reported.

"1946: No wilt observed or reported.

"1947: A trace on Long Island and as far north as Valatie, Columbia County and the northern end of Greene County in the Hudson Valley. Not over a half dozen stalks found in any one field.

"1948: A trace on Long Island and as far north as Bethel, Sullivan County in the lower Hudson Valley. Only a few diseased plants in any one field." -- Charles Chupp

NEW JERSEY

"In the years 1945, '46, '47 and ' 48 I would classify the relative severity of sweet corn wilt in New Jersey as '45 very slight, '46 slight, '47 moderate, and '48 slight." -- C. M. Haenseler

Haenseler's summary quoted above is supported by detailed observations in his testing plots.

PENNSYLVANIA

R. S. Kirby reports as follows: "In 1945 wilt was first found on July 13. The average loss was 0.2 percent, maximum loss was 10 percent. In 1946 the average loss was 0.1 percent, maximum 10 percent. In 1947, first found June 25, loss was 0.5 percent. In 1948 not found serious in any field, loss was not over 0.2 percent."

MARYLAND

"Our records for 1945 and 1946 show a "trace" of bacterial wilt and for 1947 'none observed.' No bacterial wilt has come to our attention this year (1948). I am in fairly close touch with the canning acreage of sweet corn in Maryland and it is almost entirely planted with hybrids resistant to bacterial wilt. In the eight years that I have been in Maryland I have never observed a case of bacterial wilt in a commercial planting. The 'trace' mentioned in 1945 and 1946 probably represents cases of bacterial wilt from home gardens sent to this laboratory for diagnosis." -- Carroll E. Cox.

OHIO

"Stewart's disease of sweet corn has nearly passed out of consideration since the introduction of hybrids. We do meet up with it occasionally in certain pure lines of field corn. Our corn breeder, Mr. Stringfield, always is conscious of the potential possibility of bacterial wilt and is on the lookout for it each season. He tells me that Stewart's disease has been negligible in his breeding and increase plots since 1940." -- R. C. Thomas

INDIANA

"We have had no severe wilt epidemics since about 1932 at about which time Golden Cross Bantam was introduced. In certain years we have a small amount of infection in some of our more susceptible types, which is more

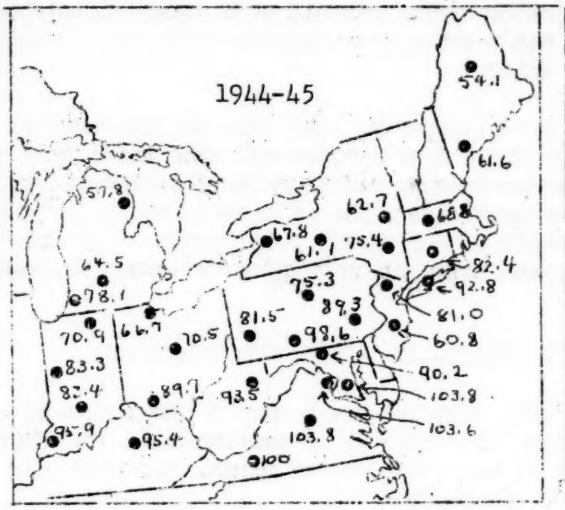



Fig. 1. Winter temperature indices for 1944-45.

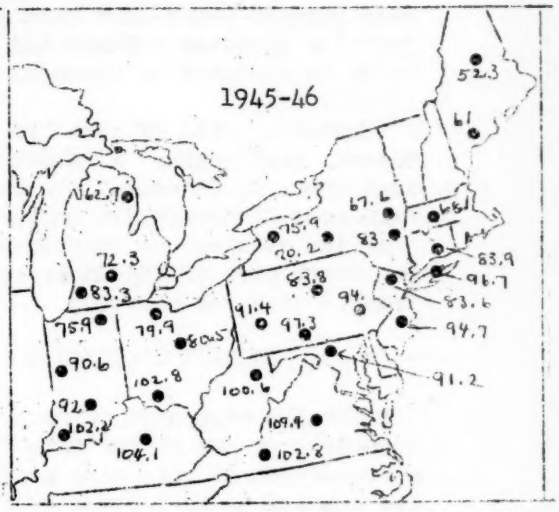



Fig. 2. Winter temperature indices for 1945-46.

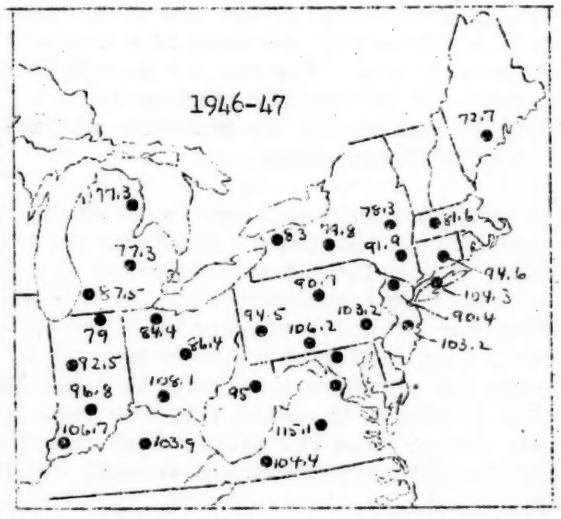



Fig. 3. Winter temperature indices for 1946-47.

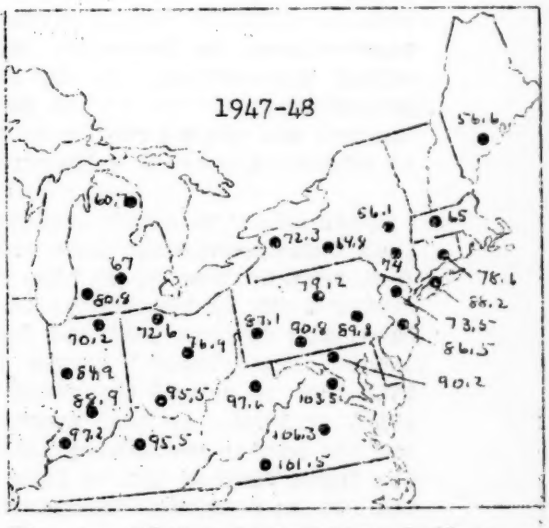



Fig. 4. Winter temperature indices for 1947-48.

or less coincidental with higher population of flea beetle. There have been certain years when late season infection has been quite extensive, 1947 for instance. There has not been a great amount this year (1948) to my knowledge." -- Glenn M. Smith.

"Bacterial wilt of corn was more severe in 1946 than it has been in several past years. I remember receiving letters and specimens from several areas in Indiana . . . It was severe enough here at Lafayette to obtain good differentials on inbreds and hybrids of dent corn . . . This year the disease was conspicuously absent until quite late -- the middle to latter part of September -- and then did not become abundant before frost." -- A. J. Ullstrup

## DISEASE CONDITIONS AS RELATED TO WINTER TEMPERATURES

Since the abundance of bacterial wilt of sweet corn in relation to winter temperatures was at one time made the subject of experimental forecasts, a comparison is here also made of the relation of winter temperatures to the conditions here reported for 1945-1948.

It may be remembered (Incidence of Bacterial Wilt of Sweet Corn, 1935-1940: Forecasts and Performance, by N. E. Stevens and C. M. Haensler, PDR 24: 152-157) that a winter index consisting of the sum of the mean temperatures for December, January and February was used as a measure of winter temperature. In the accompanying maps, Figures 1 - 4, the information is presented in the same way. In the earlier work an index of a hundred was considered as critical in indicating the probable occurrence of bacterial wilt in commercially significant amounts.

While it is no doubt true that varieties of sweet corn more resistant than those previously used are now largely planted in New England, the fact remains that at no time during the period being considered did the winter index in Massachusetts or Connecticut approach 100. On the other hand, the reports indicate for New York, New Jersey, and even for Pennsylvania, significantly larger losses from bacterial wilt on sweet corn in 1947 than in any of the other years for which we have reports i.e., 1945, 1946, or 1948. In that connection it should be noted that the temperature for the winter preceeding 1947 was warmer than the others here reported. The index reached 104 on Long Island, 103 in central New Jersey, and 103 and 106 in southern Pennsylvania.

Regarding Maryland, it has been true for many years that resistant varieties dominate the canning area. Only in such notable winters as that preceeding the summer of 1936, was the index at Baltimore, for example, below 100. The reports from Ohio indicating negligible amounts of bacterial wilt throughout the four-year period may well be due in part to the use of resistant varieties. It may, however, be significant that although the normal temperatures for Lafayette, Indiana, and Wooster, Ohio, are almost identical, for this particular four-year period Wooster was

materially colder than Lafayette, in fact, most of the State of Ohio was somewhat colder than Indiana. The reports from Indiana, although they relate to dent corn, may be particularly significant in that, in this case at least, bacterial wilt was noticeably more severe in 1947 than 1945, 1946, or 1948, and as the maps clearly show the winter preceeding 1947 was considerably warmer than that preceeding any of the other years.

For these four years, then, the available evidence indicates that the abundance of bacterial wilt is closely correlated with the temperature of the preceeding winter, as was the case during the years of our earlier observations.

UNIVERSITY OF ILLINOIS, URBANA

## WINTER WEATHER OF 1948-49 AND PLANT DISEASE OCCURRENCE

Will the unusually severe winter affect occurrence of plant diseases this year, and perhaps even for some years to come? We believe that unusually careful observation and recording of the development of plant diseases this year would be very much worthwhile.

## EARLY APPEARANCE OF SOME DOWNY MILDEWS THIS YEAR

### EARLY OCCURRENCE OF DOWNY MILDEW ON SHALLOT IN LOUISIANA

by E. C. Tims

The earliest development of onion mildew (Peronospora destructor) on record in Louisiana was found on shallot (Allium ascalonicum) in Terrebonne Parish January 24, 1949. The disease was extensive enough at that time to give a blighted appearance to the affected plants, indicating that it had probably been active for several days. Mildew usually shows up in the southwestern part of the State early in March, but the unusually mild weather during the entire first three weeks of January, combined with much moisture in the form of rain, fog and heavy dews, made conditions ideal for early mildew development.

The early appearance of mildew in 1949 is more remarkable because of the fact that the disease was not observed at all during the spring of 1948. A large number of onion bulbs and some shallots also from a badly infected field were grown during the winter of 1947-48 without any disease appearing during the growing season. This indicates that under our conditions mildew is probably not carried from season to season in or on infected bulbs.

LOUISIANA AGRICULTURAL EXPERIMENT STATION

### TOBACCO BLUE MOLD APPEARS EARLY IN GEORGIA

by John G. Gaines

Tobacco blue mold (Peronospora tabacina Adam) was observed in a Cook County new seedbed January 11, 1949. This is the earliest seasonal observation ever made of this disease in a commercial Georgia seedbed. The affected bed was seeded November 15, and on January 11 many of the largest plant leaves were fully an inch in diameter. The grower reported seeing disease symptoms in this bed as early as January 8.

Tobacco plants are now coming up in the majority of beds sown the last week in December. Normal seeding time in Georgia is the last week in December and the first week in January. A small percentage of growers still insist on seeding earlier with the unfounded hope that early plants might escape severe disease damage. This latter practice almost invariably results in unseasonal, early, and severe mold at a time when disease is much more destructive than later in the season. More early beds than ever before were sown in late November and early December of 1948. Mild weather with ample rain has encouraged early seed germination and rapid growth of tobacco plants in these beds. Except for a few cool days the last week in December and the first week in January, temperatures have been ideal for disease development throughout the winter wherever volunteer and holdover tobacco plants have been permitted to grow in old 1948 beds. Continued mild weather during the next three weeks will result in an early mold establishment in many locations where plants will be large enough to permit heavy spore production. If this is followed by cold or cloudy weather, in the absence of frequent heavy rains, during February and early March, maximum plant loss is to be expected unless adequate steps are taken by growers to control the disease and protect affected plants from freezing temperatures.

DIVISION OF TOBACCO, MEDICINAL AND SPECIAL CROPS

## SOME CORRECTIONS

### I

Page 271 - Plant Disease Reporter Supplement 178 - December 30, 1948
Table 1. "Control of Late Blight of Potato: Materials used in 1948".

Kindly add under "Fla. - Belle Glade" - Materials used as Dusts the following note:

Note: Dust applied last three weeks before harvest when grower considered vines too big for spray machine to pass over without excessive wheel damage. Blight appeared following dust application but did not affect total yield appreciably.

CONTROL OF LATE BLIGHT ON POTATO: MATERIALS USED AS SPRAYS IN 1948

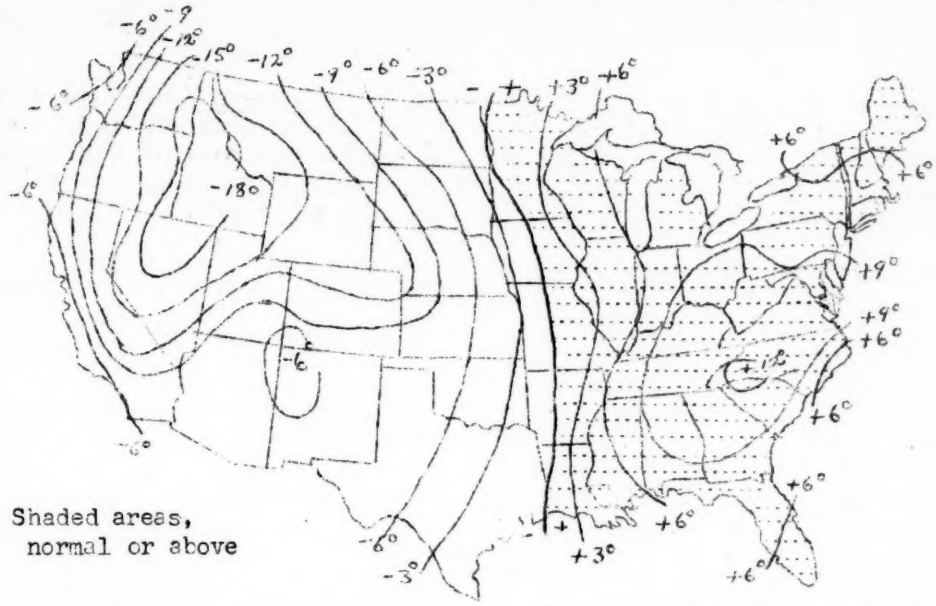
| Fungicide | Formula | Percent growers using | Percent applied by Ground machine | Airplane | Results |
|---|---|---|---|---|---|
| Dithane D-14 | 2-1-1/2-100 | 100 | 100 | 0 | 5% loss* |

* This loss represents a 75% loss in 160 acres where crop was sprayed improperly.

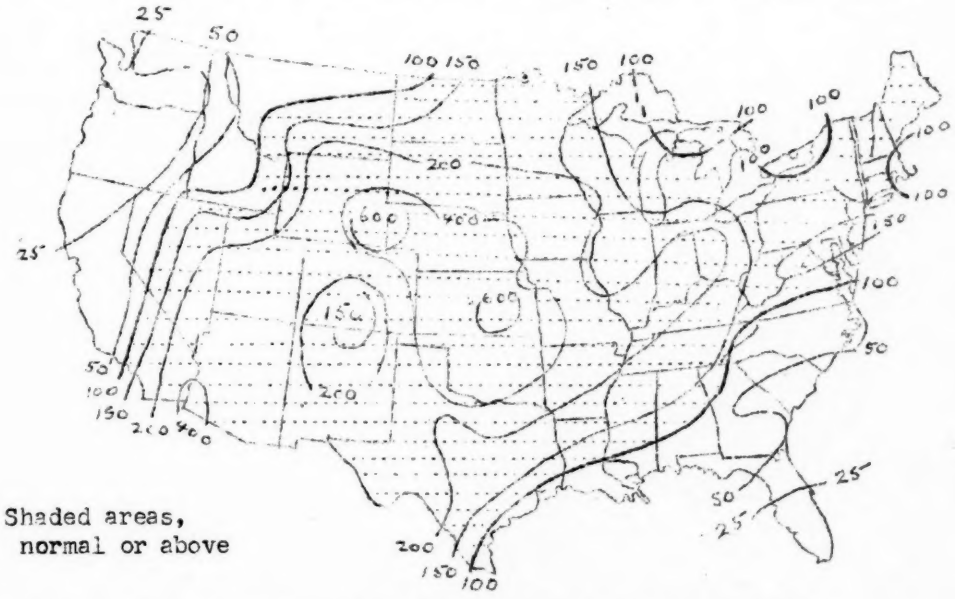
II

In Volume 33 page 40 table 1 (Jan. 15, 1949) Ceresan M was applied at the rate of 1/2 ounce per bushel and not at 2 ounces as stated in the table. On page 41, lines 9 and 10, the recommended rate of application for Panogen (2.1% methyl-mercury-de-cyan-diamide) should be 3/4 to 1 fluid ounce per bushel and not 2 or 3 ounces, as stated.

Please make these corrections in your copy.




Map I. Departure of mean temperature from normal for January, 1949




Map II. Percentage of normal precipitation for January, 1949.

## JANUARY WEATHER

(From U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for the week ending February 8, 1949)

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